
Archaeological Impact Assessment

WATER PIPELINE AND ACCESS ROUTE FOR THE BOOYSENDAL PLATINUM MINE, STEELPOORT, MPUMALANGA PROVINCE

Prepared For

GCS Environmental Consultants

By



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VERSION 1.0
23 OCTOBER 2009

KNOWLEDGEMENT OF RECEIPT

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I, Jaco van der Walt as duly authorised representative of Wits Heritage Contract Unit, University of the Witwatersrand, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contract Unit have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which GCS Environmental Consultants was appointed as Environmental Assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998), other than fair remuneration for worked performed on this project.

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Executive summary

Site name and location: Water pipeline and access route to the Booyesdal Platinum Mine, Steelpoort, Mpumalanga Province.

1:50 000 Map: 2530 AA & 243 CC

EIA Consultant: GCS Environmental Consultants

Developer: Mvelphanda Resources Limited.

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Date of Report: 23 October 2009

Findings of the Assessment: Five sites of heritage significance were identified during the survey. The sites range from Middle and Late Iron Age sites, farm labourer dwellings and rock engravings.

On the present layout plan only 34, 35 and 36 will be directly impacted upon by the proposed development during the construction phase of the proposed project. Please refer to section 8 of this report for recommendations.

If these recommendations are adhered to there is from a Heritage point of view no reason why the development can not commence.

General

If during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. The possibility of the occurrence of informal or unmarked graves and archaeological sites can not be excluded. It is important to note that the scope of service was to survey only the development area and not the entire property.

Disclaimer: *Although all possible care is taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. Wits Heritage Contracts Unit and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

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- The technology described in any report
- Recommendations delivered to the Client.

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1. INTRODUCTION

Wits Heritage Contracts Unit was contracted by GCS Environmental Consultants to conduct an Archaeological Impact Assessment for the proposed extension of the Lebalelo water pipeline to take water to the Booyendal Platinum mine as well as access routes to the mine, Steelpoort, Mpumalanga Province. The report forms part of the EMP for the proposed project and will also be included into the EIA. The aim of the study is to identify heritage sites, document, and assess their importance within Local, Provincial and national context. To assess the impact of the proposed project on non renewable heritage resources and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes in Phase 1: Information collection from various sources and consultations; Phase 2: Physical surveying of the area on foot and by vehicle; and Phase 3: Reporting the outcome of the study.

During the survey, 5 sites with heritage value were identified. General site conditions and features on sites were recorded by means of photos, GPS location, and site description. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to SAHRA provincial office for peer review.

1.2 TERMS OF REFERENCE

Conduct brief desktop study to:

Review available literature, previous heritage studies and other relevant information sources. Gather data and compile a background history of the area. Identify known and recorded archaeological and cultural sites; and determine whether the area is renowned for any cultural and heritage resources, such as Stone Age sites, Iron Age sites, informal graveyards or historical homesteads.

Conduct a field study to:

Consult with locals residing in the study area to gather information on oral history, local history, possible informal graves, cemeteries, and other areas of cultural significance. Systematically survey the proposed project area to locate, identify record, photograph and describe sites of archaeological, historical or cultural interest; and record GPS points of significant areas identified. Determine the levels of significance of the various types of heritage resources recorded in the project area;

Reporting

Identify the anticipated impacts, as well as cumulative impacts, of the operational units of the proposed project activity on the identified heritage resources for all 3 phases of the project, i.e. construction, operation and decommissioning phases. Consider alternatives should any significant sites be impacted adversely by the proposed project. Ensure that all requirements of the local South African Heritage Resources Agency (SAHRA) are met; and ensure that all studies and results are sufficient to comply with the relevant requirements of the Equator Principles, World Bank Standards and IFC Principles and Performance Standards and National legislation. To assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.3 Nature of the development

The proposed extension of the Lebalelo pipeline will transfer the 7Ml/day of water that Northam Platinum Limited acquired through the Booyensdal deal to the farm Booyensdal 43JT by way of a 300mm diameter pipeline. The first section of the pipeline will be constructed next to the existing pipeline in a servitude that is in the name of the LWUA. This part of the pipeline crosses over the following farms and portions: Portion 1: Dwars Rivier 372KT, Portion 3 and remaining extent of Thorncliffe 374KT and the remaining extent of Helena 6JT. The extension from Helena 6JT in a new servitude will traverse southwards. The relevant Farms and Portions for this section of the Pipeline crosses over the following farms: Remaining extent and portion 3 of Helena 6JT, Der Brochen 7JT, Booyensdal 43JT.

The proposed new access road will begin parallel to the pipeline from Helena 6JT, crossing a small portion of Mareesburg 8JT, and ending in Der Brochen 7JT where it diverts from the pipeline with a alternative access road extending into Booyensdal 43JT and looping back to Der Brochen 7JT to the plant.

1.4 Description of study area

The study area forms part of the Bushveld Igneous Complex, and can be considered as natural veldt with almost no impact on it. Topographically, the area is mountainous with stretches of more dense vegetation (*Dichrostachys* shrubs) and a number of large hills and outcrops. Large parts of the study area are currently utilized as a game farm for Anglo Platinum. Several streams and tributaries run through the study area that would have been the water source for communities living in the area in antiquity.

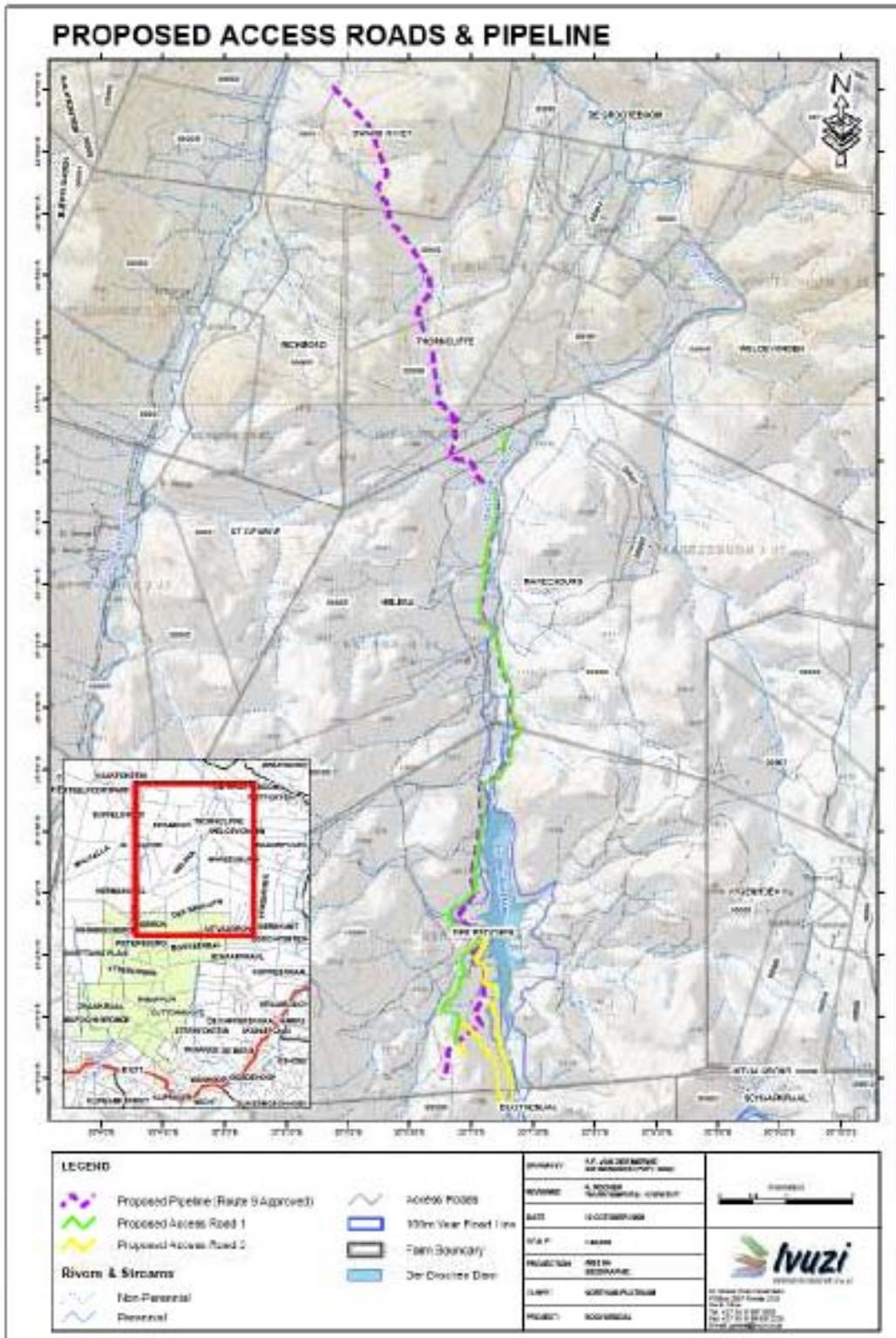


Figure 1: Locality map

2. APPROACH AND METHODOLOGY

The aim of the study is to extensively cover all data available to compile a background history of the study area; this was accomplished by means of the following phases.

2.1 PHYSICAL SURVEYING

Due to the nature of cultural remains, the majority that occurs below surface, a physical walk through of the study area was conducted. Wits Heritage Contract Unit was appointed to conduct a survey of the proposed development. The study area was surveyed by two professional archaeologists over a period of 3 days, by means of vehicle and extensive surveys on foot. As per the clients instructions where the pipe line and road run parallel a buffer zone of 25 meters was surveyed from the centre line. Where the road occurs on its own a buffer zone of 20 meters was surveyed from the centre line. For the pipeline a buffer zone 8 meters was surveyed from the centre line. In addition to that the survey team consulted several specialists in their respective fields and recommendations were made in conjunction with them. Prof. T Huffman from the University of the Witwatersrand gave specialist input with regards to the Iron Age component while the curator of the Lydenburg museum Mr. J.P Cilliers was consulted about the general history of the area.

Aerial photographs and 1:50 000 maps of the area were consulted and literature of the area were studied before undertaking the survey. The purpose of this was to identify topographical areas of possible historic and pre-historic activity. All sites discovered both inside and bordering the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. Photographs on digital film were taken at significant sites.

3. Abbreviations and definitions

3.1 Abbreviations

<i>ASAPA</i> : Association of South African Professional Archaeologists	<i>BPEO</i> : Best Practicable Environmental Option
<i>CRM</i> : Cultural Resource Management	<i>DEA&DP</i> : Department of Environmental Affairs and Development Planning
<i>DEAT</i> : Department of Environmental Affairs and Tourism	<i>DWAF</i> : Department of Water Affairs and Forestry
<i>EIA practitioner</i> : Environmental Impact Assessment Practitioner	<i>EIA</i> : Environmental Impact Assessment
<i>EIA</i> : Early Iron Age	<i>ESA</i> : Early Stone Age
<i>LIA</i> : <i>Late Iron Age</i>	<i>MSA</i> : <i>Middle Stone Age</i>
<i>GPS</i> : Global Positioning System	<i>HIA</i> : Heritage Impact Assessment
<i>I&AP</i> : Interested & Affected Party	<i>IDP</i> : Integrated Development Plan
<i>LSA</i> : Late Stone Age	<i>LIA</i> : Late Iron Age
<i>MSA</i> : Middle Stone Age	<i>MIA</i> : Middle Iron Age
<i>NEMA</i> : National Environmental Management Act	<i>NHR Act</i> : National Heritage Resources Act
<i>PHRA</i> : Provincial Heritage Resources Agency	<i>PSSA</i> : Palaeontological Society of South Africa
<i>ROD</i> : Record of Decision	<i>SACLAP</i> : South African Council for the Landscape Architect Profession
<i>SAHRA</i> : South African Heritage Resources Agency	<i>SAIA</i> : South African Institute of Architects
<i>SAPI</i> : South African Planning Institute	<i>SDF</i> : Spatial Development Framework

3.2 Definitions

Archaeological resources:

This includes material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;

Rock art:

Being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, including any area within 10m of such representation;

Wrecks:

Being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or

associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

Military:

Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance:

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development:

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or hoardings;
- any change to the natural or existing condition or topography of land;
- any removal or destruction of trees, or removal or vegetation or topsoil

Heritage resources:

This means any place or object of cultural significance

Stakeholders:

A subgroup of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term includes the proponent, authorities and all interested and affected parties.

4. ARCHAEOLOGICAL LEGISLATION AND BEST PRACTICE

Phase 1 Archaeological Impact Assessments or Heritage Impact Assessments are a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources;
- Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the Environmental Impact Assessment [EIA] is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 38(1), Section 38(8) the National Environmental Management Act (NEMA) and the Mineral and Petroleum Resources Development Act (MPRDA).

The AIA should be submitted, as part of the EIA, BIA or Environmental Management Plan [EMP], to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and required additional development information, as per the EIA, BIA / EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA. Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by the Association of Southern African Professional Archaeologists [ASAPA] in collaboration with SAHRA. ASAPA is a legal body, based in South Africa, representing professional archaeology in the Southern African Development Community [SADC] region. ASAPA is primarily involved in the overseeing of archaeological ethical practice and standards. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidance in the developer's decision making process:

Phase 2 archaeological projects are primarily based on salvage / mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations should be done under a permit issued by SAHRA to the appointed archaeologist. Permit conditions are

prescribed by SAHRA and includes as minimum requirements reporting back strategies to SAHRA and deposition of excavated material at a accredited repository.

In the event of a site conservation option being preferred by the developer a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation is conducted on a site, a destruction permit must be applied for from SAHRA before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation. If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

5. Baseline Study

5.1 Evaluation of Heritage sites

This chapter describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- The unique nature of a site
- The integrity of the archaeological deposit
- The wider historic, archaeological and geographic context of the site
- The location of the site in relation to other similar sites or features
- The depth of the archaeological deposit (when it can be determined or is known)
- The preservation condition of the site
- Uniqueness of the site and
- Potential to answer present research questions.

5.1.1 Heritage Site Significance and Mitigation Measures

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report. Recommendations represented in the table below must be read in conjunction with section 8 of this report.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)

Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

5. Archaeological Context of study area

South Africa has one of the longest archaeological sequences in the world because humanity evolved in the area stretching from the Cape to Ethiopia. Most of this sequence covers the times when our ancestors used stone tools.

Several archival databases and previous phase 1 reports were utilised to give a comprehensive coverage of sites. Most extensively used is the site catalogue compiled by the Archaeology Department of the School of Geography, Archaeology, and Environmental Studies at the University of the Witwatersrand, Johannesburg.

Sites within the databases used were plotted into ArcGIS 9.1, overlaying the relevant 1:50000 topographic maps and the proposed study area. From this, relevant areas, in which a large portion of the sites clustered, were identified and the appropriate literature was reviewed.

Surveys and mitigation projects by the National Cultural History Museum, Wits University, Matakoma Heritage Consultants and Archaetnos were reviewed to compile a back ground history of the area. For this purpose the work done by Wits University on the farm der Brochen and Booyensdal were the most appropriate. A short literature review of known sites in the study area follows:

The archaeology of the area can be divided into the Stone Age, Iron Age and Historical timeframe. These can be divided as follows:

Stone Age

The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Stone Age sites have previously been identified within the larger geographical area around the study area. Close to Ohrigstad sites from the Middle and Late Stone Age are known and Middle Stone Age sites are also known from the Polokwane area (Bergh 1999: 4). It includes the well known site known as Boesmanrotsskulling (Korsman & Meyer 1999: 94). Rock art are found in abundance in the Steelpoort valley including rock engravings close to the Steelpoort and Olifants River (Bergh 1999: 5).

Earlier Stone Age: The period from ± 2.5 million yrs - ± 250 000 yrs ago. Acheulean stone tools are dominant:

The Early Stone Age in southern Africa is defined by the Oldowan complex, primarily found at the sites Sterkfontein, Swartkrans and Kroomdraai, situated within the Cradle of Humankind, just outside Johannesburg (Kuman, 1998). Within this complex, tools are more casual and expediently made and tools consist of rough cobble cores and simple flakes. The

flakes were used for such activities as skinning and cutting meat from scavenged animals. This industry is unlikely to occur in the study area.

The second complex is that of the more common Acheulean, defined by large handaxes and cleavers produced by hominids at about 1.4 million years ago (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds. No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The presence and significance of finds will be determined by a field investigation.

Middle Stone Age: Various lithic industries in SA dating from ± 250 000 yrs – 22 000 yrs before present.

During the Middle Stone Age, significant changes start to occur in the evolution of the human species. These changes manifest themselves in the complexity of the stone tools created, as seen in the diversity of tools, the standardisation of these tools over a wide spread area, the introduction of blade technology, and the development of ornaments and art. What these concepts ultimately attest to is an increase or development of abstract thinking. By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study area, they may be sites of archaeological significance.

MSA artefacts are common through out southern Africa, but unless they occur in undisturbed deposits, they have little significance. Some MSA sites are on record close to the study area.

Later Stone Age: The period from ± 22 000-yrs before present to the period of contact with either Iron Age farmers or European colonists.

By the Late Stone Age, human beings are anatomically and culturally modern. Tools associated with this time period are specialised, and commonly associated with hunter-gatherer groups. It is also within this period that contacts with migrating groups occur throughout southern Africa. Initial contact was between hunter-gatherer groups and expanding Bantu farming societies, and secondly with the arrival of colonist along the coast.

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). Several rock art sites are on record to the south and east of the general project area.

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. If there are rock shelters or caves in the study area, they may contain LSA sites of significance.

Iron Age (general)

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

The Early Iron Age: Most of the first millennium AD.

The Middle Iron Age: 10th to 13th centuries AD

The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

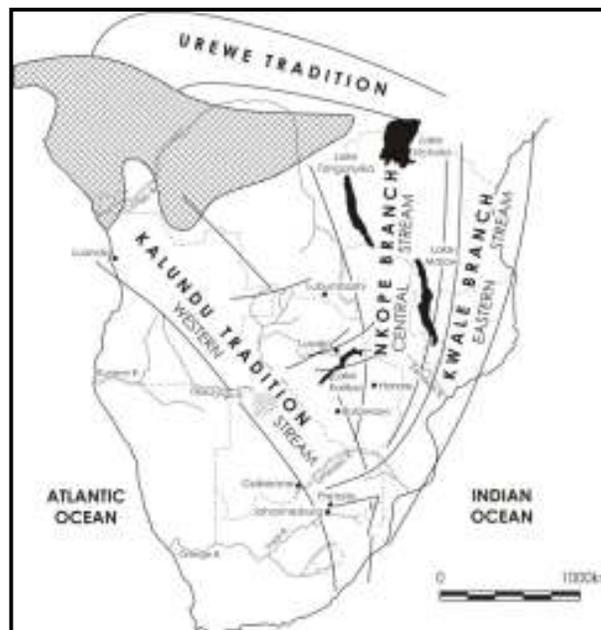


Figure 2: Movement of Bantu speaking farmers (Huffman 2007)

Early Iron Age

Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper. A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites.

Sites belonging to the EIA consisting of Mzonjani ceramics dating to between AD 450 and 700 were found in the area. Mzonjani is the second phase of the Kwale branch of the Urewe Tradition. Mzonjani merged with Happy Rest of the Kalundu Tradition to produce Doornkop.

Middle Iron Age

At about AD 1300, the first Sotho/Stwana speaking people, producing Icon pottery of the Urewe Tradition moved into southern Africa. Around the study area they interacted with earlier people in the area producing Eiland Pottery.

Late Iron Age

The Late Iron Age is very well represented around the surveyed area (Bergh 1999). It is also known that copper has been mined close to the study area (Bergh 1999). The early trade routes used by the indigenous tribes also went past the Steelpoort and Olifants River (Bergh 1999).

At the beginning of the 19th century the Pedi and Roka stayed in this area. These people fled under their chief Sekwati, from the Ndebele of Mzilikazi in 1822, but later on returned (Bergh 1999).

A badly preserved site possibly belonging to the Madikwe facies of the Urewe Tradition was identified to the north of the study area. This is important since Madikwe (AD1500 – 1700) produce Marateng pottery (AD 1700 – 1840) that is associated with the modern Pedi. Sites with Marateng pottery can be expected in the study area

Evidence for Iron Age activity will most likely be concentrated along water courses and rocky outcrops marked by ceramic clusters or dry stone walling.

Historic Timeframe

The historic timeframe sometimes intermingles with the later parts of the Stone and Iron Age, and can loosely be regarded as times when written and oral accounts of incidents became available. Therefore the accounts of early travellers are a valuable source of information.

During the brief desktop study evidence of only one of these early travellers was found that closely visited the surrounding area namely Robert Scoon in 1836 (Bergh 1999). He passed through an area to the southwest of the surveyed area. The Voortrekkers under Louis

Trichard also moved through this area in 1837 (Bergh 1999). The first white farmers only settled here after land had been traded from Sekwati in 1845 and the Swazi in 1846 (Bergh 1999).

Most important for the study area is the discovery of platinum nearby. Some sources attribute the discovery to Hans Merensky between 1924 and 1926. While other sources attribute the discovery to Frederic W. Blaine. What ever the case may be, it can be expected to find historical mining or exploration in the study area dating after 1924.

5.2 Probability of occurrence of sites

From the above information it is clear that a medium possibility of the occurrence of cultural heritage sites could be expected in the study area.

A. PALAEOLOGICAL LANDSCAPE

CONTEXT

Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations. Exposed by road cuttings and quarry excavation: *Unknown*

B. ARCHAEOLOGICAL LANDSCAPE

CONTEXT

NOTE: *Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface.*

Archaeological remains dating to the following periods can be expected with in the study area:

Stone Age finds

- ESA: *Low Probability*
- MSA: *Medium Probability*
- LSA: *Medium Probability*
- LSA –Herder: *Low Probability*

Iron Age Finds

- EIA: *Medium Probability*
- MIA: *Medium Probability*
- LIA: *Medium - High Probability*

Historical finds

- Historical period: *Medium Probability*
- *Historical dumps: Medium Probability*
- *Structural remains: Medium Probability*

Military Finds

- *Battle and military sites: Low Probability*

Burial/Cemeteries

- *Burials over 100 years: Medium Probability*
- *Burials younger than 60 years: High Probability*

Subsurface excavations including ground levelling, landscaping, and foundation preparation can expose any number of these.

6. Impact Assessment

Several sites occur in the study area, most of them were identified during previous heritage surveys. The sites need to be plotted on a sensitivity map so that these areas can be avoided during construction. A short description of the sites found during the current survey (Site 32 – 36) follows.

The following co-ordinates are available for the sites within the study area (WGS84).

Site Number	Type Site	Co-ordinates
Site 1	I.A shelter	S25 05 55.5 E30 07 00.1
Site 2	Mining shaft	S25 05 58.8 E30 06 54.5
Site 3	Historic dwellings	S25 05 49.5 E30 06 37.6
Site 4	I.A find spot	S25 05 49.5 E30 06 49.2
Site 5	Mining shaft	S25 05 54.6 E30 06 54.4
Site 6	Historic dwellings	S25 05 54.0 E30 06 55.0
Site 7	I.A	S25 05 41.0 E30 06 37.6
Site 8	I.A/historic shelter	S25 05 46.6 E30 06 31.8
Site 9	I.A	S25 05 48.0 E30 06 30.3
Site 10	Historic dwellings	S25 05 45.3 E30 06 38.4
Site 11	Historic dwellings	S25 05 17.4 E30 06 46.4
Site 11 Extend		S25 05 15.5 E30 06 44.6
Site 12	I.A find spot	S25 05 07.8 E30 06 37.9
Site 13	I.A/ Historic	S25 05 08.1 E30 06 32.9
Site 14	I.A shelter	S25 05 10.5 E30 06 31.7
Site 15	Historic dwellings	S25 05 11.3 E30 06 29.7
Site 16	I.A find spot	S25 05 18.1 E30 06 22.9
Site 17	I.A find spot	S25 05 14.0 E30 06 26.8
Site 18	I.A	S25 05 19.3 E30 06 21.0
Site 19	I.A	S25 05 21.5 E30 06 18.6
Site 19 Extend		S25 05 24.4 E30 06 17.0
Site 20	Possible historic	S25 05 00.5 E30 06 17.0
Site 21	I.A/Historic	S25 05 31.7 E30 06 23.5
Site 22	I.A	S25 05 31.3 E30 06 44.9
Site 23	Historic dwellings	S25 05 31.5 E30 06 52.2
Site 25	Historic dwellings	S25 05 26.0 E30 06 52.8
Site 26	Historic dwellings	S25 05 36.4 E30 06 51.8
Site 26 Extend		S25 05 35.0 E30 06 52.9
Site 27	Historic dwellings	S25 05 36.7 E30 06 53.5
Site 28	Historic dwellings	S25 05 32.3 E30 06 52.9
Site 29	Historic dwellings	S25 05 23.8 E30 06 56.5

Site 30	Historic dwellings	S25 05 10.1 E30 06 49.7
Site 31	Cemetery	S25 05 17.4 E30 06 54.1
Site 32	Historic dwellings	S25.08973 E30.11381
Site33	I.A	S25.09410 E30.12165
Site 34	Rock Art	S25.09222 E30.12240
Site 35	I.A	S25.07728 E30.11891
Site 36	Recent/Historic dwelling	S25.06653 E30.11725
Site 36 Extend		S25.06675 E30.11707
Mat 1	I.A	S25.02819 E30.12696
Mat 2	I.A	S25.02889 E30.12552
Mat 3	I.A	S25.02884 E30.12409
Mat 4	I.A	S25.02945 E30.12376
Mat 5	I.A	S25.04271 E30.12460

6.1 Site 32

This site consists of the rectangular stone wall foundations of a cattle kraal measuring 10 x 15 meters. The site is located next to an existing gravel road and is located approximately 42 meters from the proposed pipe line.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction



Figure 3: *Rectangular stone wall foundations*



Figure 4: Proximity of Site 32 to the proposed pipeline

6.2 Site 33

This is the location of the foundations of a single stone wall enclosure. The site conforms to other Iron Age cattle kraals that have been found in the study area. The site is approximately 66 meters from the proposed access route.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Generally Protected A (GP.A)	-	High -Medium Significance	Mitigation before destruction



Figure 5: Remains of circular stone wall

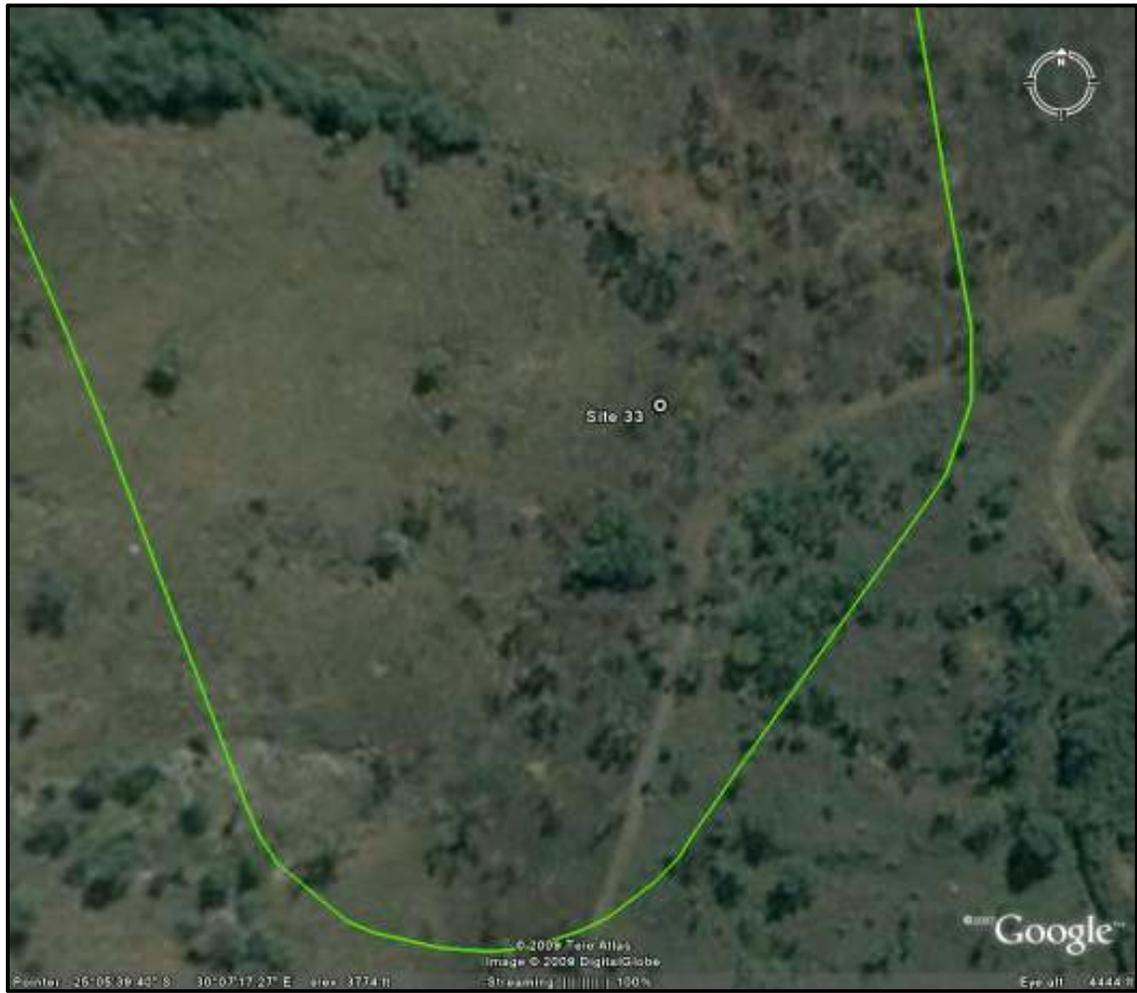


Figure 6: Proximity of Site 33 to the proposed access route

6.3 Site 34

This is the location of several abstract images pecked into large boulders next to the Dwars River. The site is located approximately 21 meters from the proposed access route.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
Generally Protected A (GP.A)	-	High - Medium Significance	Mitigation before destruction

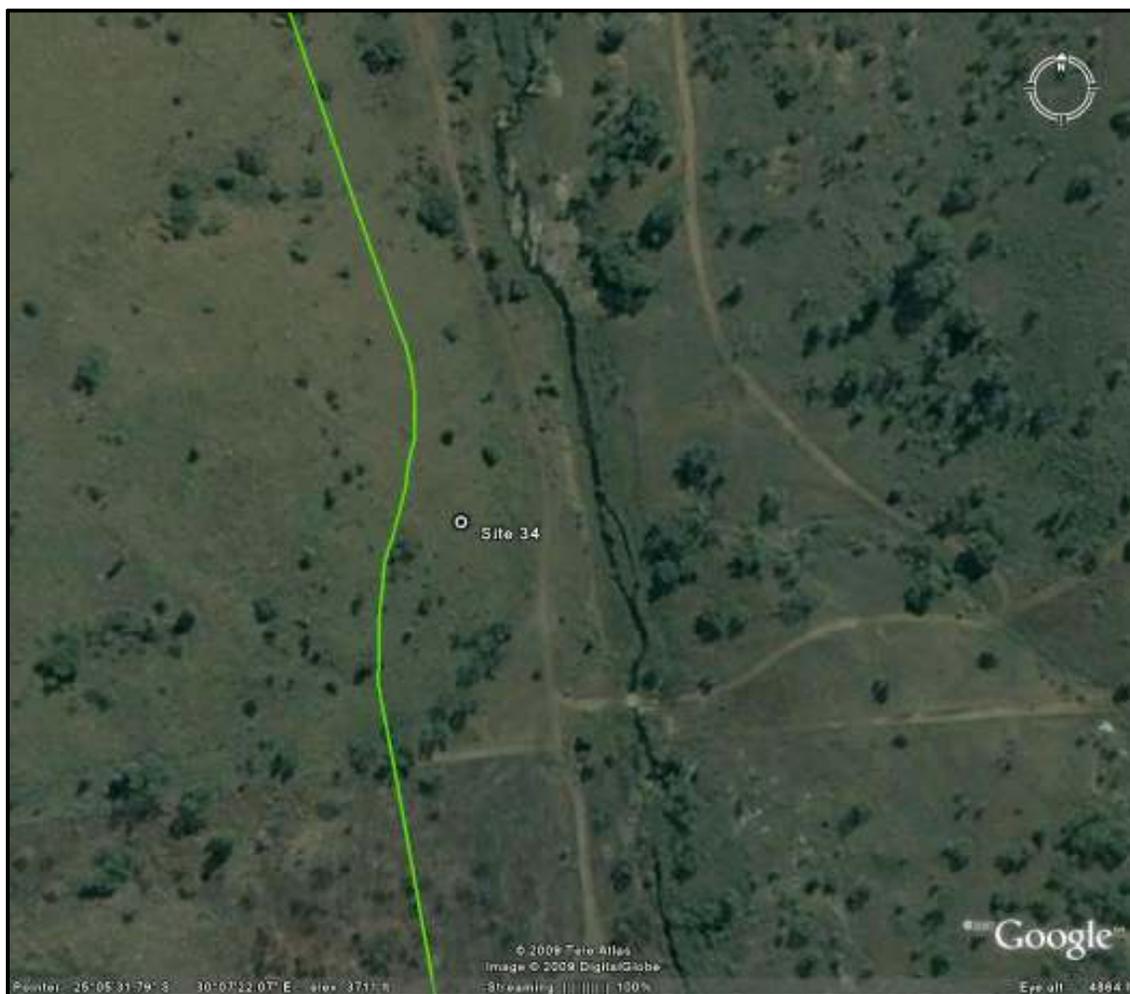


Figure 7: Proximity of Site 34 to the proposed access route.



Figure 8: *Abstract Rock engraving*

6.4 Site 35

The site consists of a scatter of decorated and undecorated ceramics that mark a Iron Age site. Decorated ceramics consist of herringbone incisions, characteristic of what archaeologist call the Eiland ceramic facies (AD1000 – AD 1300). No burned structures or features are visible and very little archaeological deposit occurs on site due to the lack of topsoil on a rocky surface. The site is located approximately 20 meters from the proposed access route.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Generally Protected C (GP.C)	-	Low- Significance	Destruction



Figure 9: *Decorated and Undecorated ceramics from Site 35*



Figure 10: Proximity of Site 35 from the proposed access route and pipe line

6.5 Site 36

This site consists of the rectangular mud wall foundations of a dwelling measuring approximately 8 x 4 meters. Just south of this is the rectangular stone wall foundations of a cattle kraal. No ceramics are found on site and cultural material consists of glass, wire and iron artefacts. The site is located directly on the proposed pipeline.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Generally Protected C (GP.C)	-	Low- medium Significance	Recording before destruction

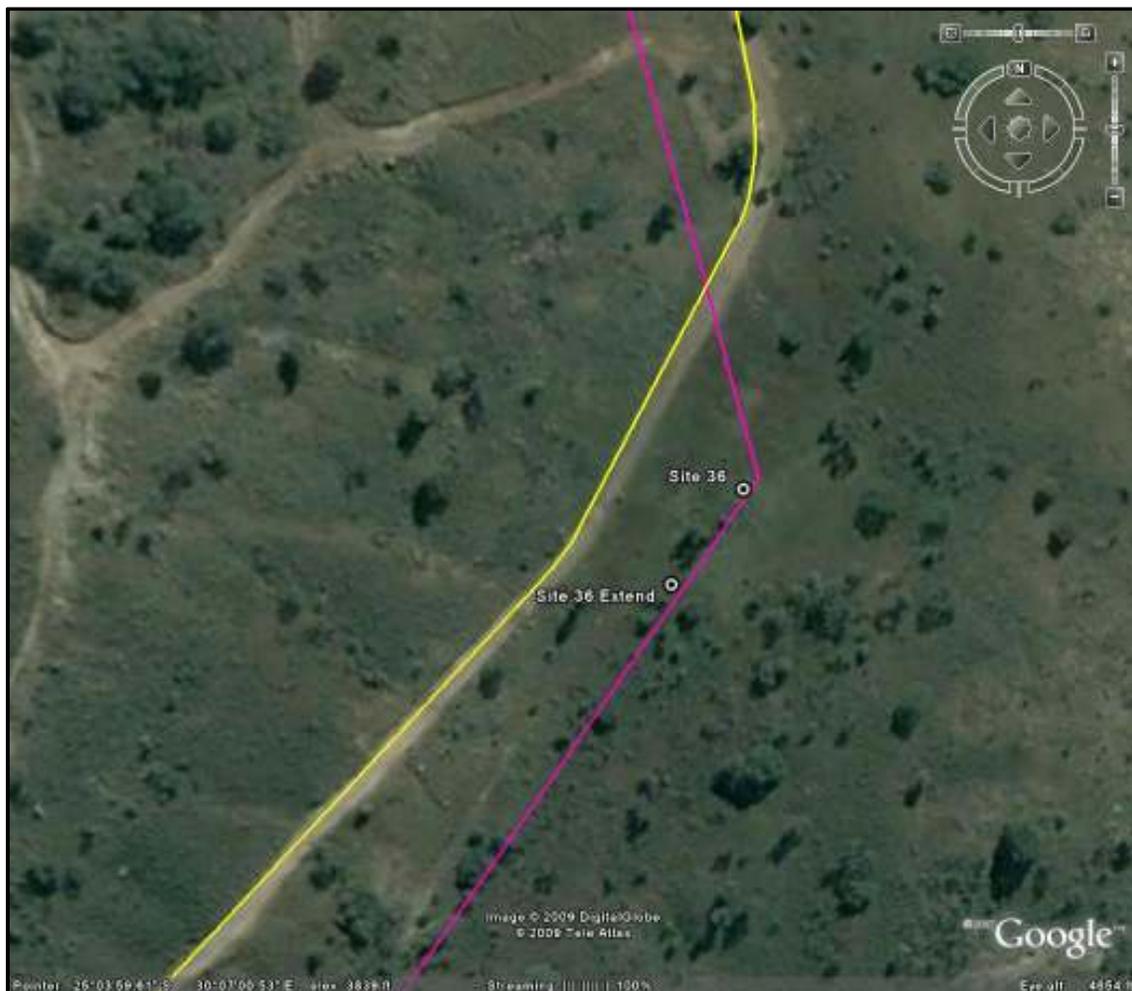


Figure 11: Proximity of site to the proposed pipe line and access route

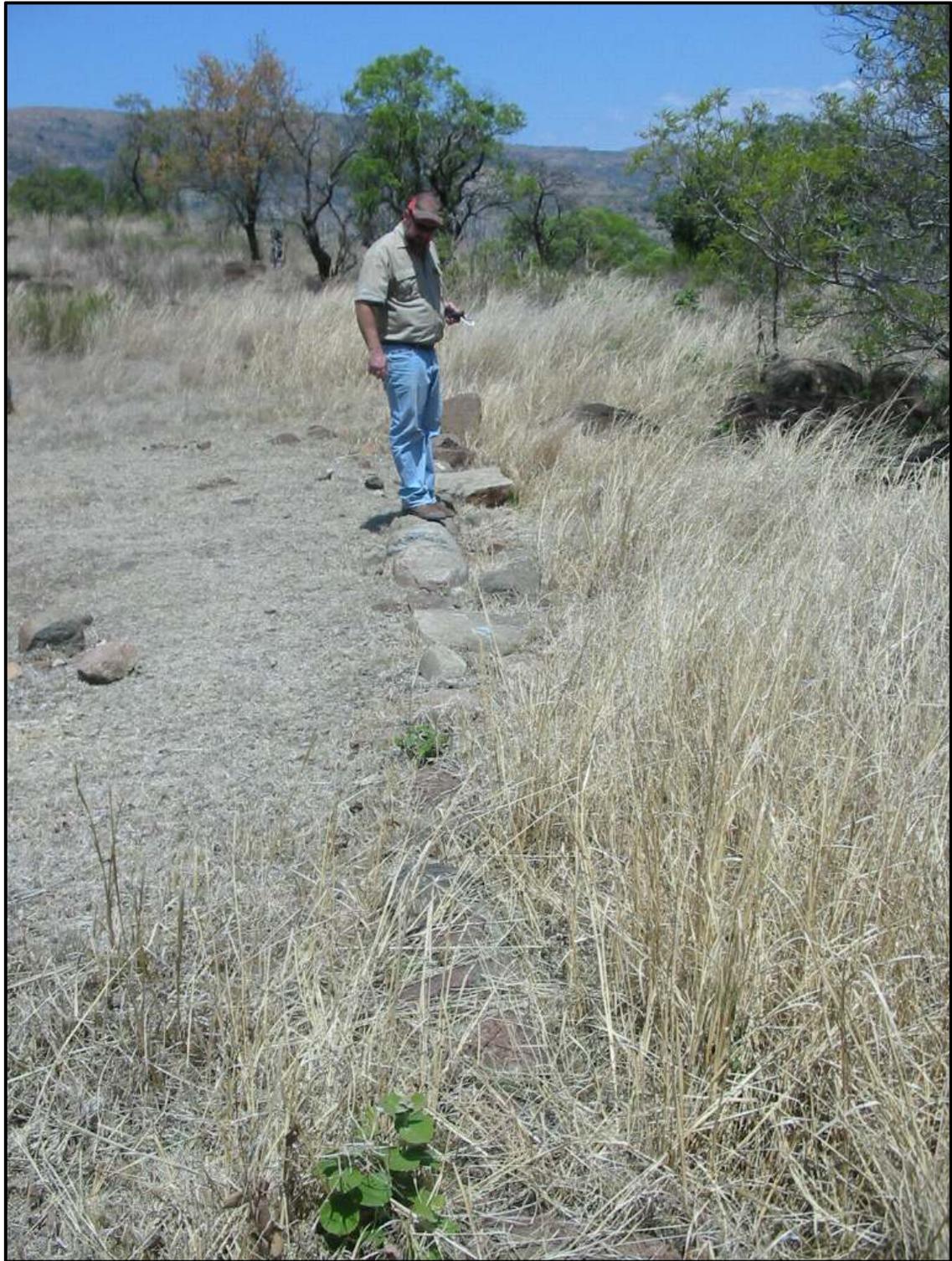


Figure 12: *Rectangular stone wall foundation*

7. ASSUMPTIONS AND LIMITATIONS

Due to the nature of cultural remains that occur, in most cases, below surface, the possibility remains that some cultural remains may not have been discovered during the survey.

Medium archaeological visibility is present on site but the possibility of the occurrence of informal and unmarked graves or archaeological remains can not be excluded. The area north of the new proposed substation have only been scanned since a pipeline is already constructed in that area that would have destroyed any significant heritage site.. Although Wits Heritage Contracts unit surveyed the area as thorough as possible, it is incumbent upon the developer to inform the relevant heritage agency should further cultural remains be unearthed or laid open during the process of development.

8. ASSESSMENT AND RECOMMENDATIONS

Findings of the Assessment. Five sites of heritage significance were identified during the survey. The sites range from Middle and Late Iron Age sites, farm labourer dwellings and rock engravings.

On the present layout plan only 34, 35 and 36 will be directly impacted upon by the proposed development during the construction phase of the proposed project. The following recommendations are applicable for the sites:

Site 32: (Historical)

No direct impact is foreseen on the site during construction of the pipeline and no further action is necessary for this site.

Site 33 (Late Iron Age)

No direct impact is foreseen on the site during construction of the access route and no further action is necessary for this site.

Site 34 (Rock engraving)

The definition of rock art used for the purposes of this report is “Being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, including any area within 10m of such representation”. Based on this definition the images at Site 34 are classified as rock art. The meaning of the art and the age is unknown to the authors, but it is estimated that the engravings that was executed by pecking and scratching is probably less than a 100 years

old based on the lack of patina and the relative “fresh “looking scratches, if this is the case the site is not archaeological. Due to the distance of the site from the proposed access route a low impact is foreseen on the site. However it is recommended that the site is demarcated during construction of the road to protect the site during development. If this is not possible and the site is being in danger of being destroyed a rock art specialist must assess the site and make suitable recommendations.

Site 35 (Middle Iron Age site)

Due to the fact that the site is eroded and the lack of archaeological deposit or features the site is of low significance. However sites like these might contain unmarked graves and therefore it is recommended that an archaeologist is present during earth moving activities at the site to monitor and mitigate any accidental finds.

Site 36 (Historic/recent dwelling and kraal)

The site is located directly on the proposed pipeline and a direct impact is foreseen on the site. The site is given a Low Heritage Significance due to the fact that the site is not archaeological and very little surface features have been preserved. However sites like these might contain unmarked graves. It is therefore recommended that the proposed pipeline is moved to the east to preserve the site. If this is not possible out of a technical view point the site needs to be documented on scaled plan sketches and that a destruction permit is applied for from SAHRA based on an archaeologist being present during destruction of the site to monitor and mitigate accidental finds.

General

Several sites occur in the study area, most of them were identified during previous heritage surveys. These sites (Table in Section 6) need to be plotted on a sensitivity map so that these areas can be avoided during construction. A heritage resources management plan must be developed for managing the heritage resources in the study area during construction and operation of the development. This can include basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

If these recommendations are adhered to there is from a Heritage point of view no reason why the development can not commence.

If during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

9. LIST OF PREPARES

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10. STATEMENT OF COMPETENCY

The author of the report is a member of the Association of Southern African Professional Archaeologists and is also accredited in the following fields of the Cultural Resource Management Section, member number 159. Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation.

Jaco sit on the council for the CRM Section of the Association of Southern African Association Professional Archaeologists and is also a accredited CRM Archaeologist with SAHRA and AMAFA.

Jaco has been involved in research and contract work in South Africa and Botswana and conducted well over 300 AIA's since he started his career in CRM in 2000. This involved several mining operations for amongst others, Herculite Ferrochrome, Harmony Gold, Hotazel Manganese Mines, New Vaal Colliery, Transvaal Gold Mining Estates Limited, Gvm Metals Limited, BHP Biliton, Simmer and Jack and Wesizwe Platinum Mining. The results of several of these projects were presented at international and local conferences.

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ANNEXURE A: Site Distribution Map

